

## A SET OF CLAIMS

1. An apparatus for fractionating gypsum slurry from a mixer for gypsum slurry, which is provided on the mixer, the mixer being arranged so  
5 that calcined gypsum and water are mixed in a mixing area inside of a housing for preparation of the gypsum slurry, and that the gypsum slurry continuously flows from a hollow connector section into a chute section to be discharged through a slurry discharge port of the chute section:  
comprising

10 a slurry fractionation port in fluid communication with a slurry delivery conduit, the slurry fractionation port being disposed at said chute section and/or said hollow connector section so as to fractionate the gypsum slurry in said chute section and/or said hollow connector section.

2. An apparatus as defined in claim 1, further comprising valve means  
15 for opening and closing said slurry fractionation port.

3. An apparatus as defined in claim 2, comprising a casing which encloses the fractionation port and the valve means and which has a slurry delivery port, wherein said slurry delivery conduit is connected to said delivery port so as to be in fluid communication with said the fractionation  
20 port through an internal area of the casing.

4. An apparatus as defined in one of claims 1 through 3, wherein a foam feeding port, which adds foam or foaming agent to the gypsum slurry for regulating density of the slurry, is disposed on said hollow connector section and/or said chute section.

25 5. An apparatus as defined in claim 4, wherein said foam feeding port is disposed between said fractionation port and said discharge port.

6. An apparatus as defined in claim 5, wherein both of said foam feeding port and said fractionation port are disposed on said chute section, and the fractionation port is located, upstream of the foam feeding port in a  
30 direction of flow of the slurry.

7. An apparatus as defined in one of claims 1 through 6, wherein said fractionation port is disposed on a top wall of said chute section and/or said hollow connector section.

8. An apparatus as defined in claim 2 or 3, further comprising a driving device and drive control means for operating said valve means to open or close.

9. A method for fractionating gypsum slurry with use of the apparatus as defined in one of claims 1 through 8, wherein a part of the gypsum slurry in said chute section and/or said hollow connector section is delivered through said fractionation port to said slurry delivery conduit under fluid pressure of the gypsum slurry.

10. A method for fractionating gypsum slurry with use of the apparatus as defined in one of claims 1 through 8, wherein a part of the gypsum slurry limited in a content of the foam or foaming agent is delivered through said fractionation port to said slurry delivery conduit.

11. A method for fractionating gypsum slurry with use of the apparatus as defined in one of claims 2, 3 and 8, wherein a fluid passage between said slurry delivery conduit and said chute or hollow connector section is periodically closed or opened by closing and opening operation of said valve means so as to prevent growth of mass of set slurry in a fluid passage of the fractionated slurry.

12. A method for fractionating gypsum slurry with use of the apparatus as defined in one of claims 2, 3 and 8, wherein pressure of the slurry fractionated through said fractionation port is controlled by said valve means.

13. A method for producing gypsum boards with use of a mixer for mixing calcined gypsum and water in its mixing area to prepare gypsum slurry, and an apparatus for fractionating the gypsum slurry to be fed to a slurry delivery conduit: comprising

a slurry preparing step of feeding the calcined gypsum and water into the mixer to mix them therein for preparation of the gypsum slurry and

displacing the gypsum slurry from a hollow connector section to a chute section;

5 a slurry fractionating step of causing a part of the slurry effluent from said mixing area to be fractionated in said chute section and/or said hollow connector section as fractionated slurry, and feeding the fractionated slurry through said conduit to a roll coater and/or a side edge portion of a sheet of paper for gypsum board liner; and

10 a slurry discharging step of discharging a remainder of the gypsum slurry, from which the fractionated slurry has been fractionated, through a slurry discharge port of the chute section onto a center part of the sheet of paper for gypsum board liner,

wherein a core of an edge portion of the gypsum board and/or an interface portion between a core and the sheet of paper for gypsum board liner is formed by said fractionated slurry.

15 14. A method as defined in claim 13, wherein foam or foaming agent for regulating density of slurry is mixed into said remainder of the gypsum slurry after the fractionated slurry has been fractionated.

20 15. A method as defined in claim 13 or 14, further comprising a fractionated slurry agitating step of agitating said fractionated slurry with use of a slurry agitator.

16. A method as defined in claim 13, wherein said apparatus for fractionating the gypsum slurry is the apparatus as defined in one of claims 1 through 8.